# DOCUMENT MODIFICATION REQUEST (DMR)



*Refer to 1-A01-PPG-001 for Processing Instructions.*
***Print or Type** All Information (Except Signatures).*

| 1. Date | 25. |
|---|---|
| 04/18/95 | **DMR No.** 95-DMR-000723 |

| 2. Existing Document Number/Revision | 3. New Document Number or Document Number if it is to be changed with this Revision |
|---|---|
| 2-G24-ER-ADM-19.01 | n/a |
| **4. Originator's Name/Phone/Pager/Location** | **5. Document Title** |
| Mark Castagneri X8582/987-2020 | ERPD Software Management Plan |

6. Document Type ☐ Procedure ☒ Other Plan

7. Document Modification Type (Check only one)
☐ New ☐ Revision ☐ Intent Change ☒ Nonintent Change ☐ Editorial Correction ☐ Cancellation

| 8. Item | 9. Page | 10. Step | 11. Proposed Modifications |
|---|---|---|---|
| 1. | Global | | Address the red ink edits to improve document consistency. These editorial changes do not change content or intent. |
| 2. | 19 | 8.2.4 | Add under [11]: [A] Review applicable work package WBs scope and funding and discuss with work package manager, as needed, to determine if current, approved scopes and estimates support proposed project.. [B] IF project definition is not funded and approved, THEN initiate work package baseline revision steps as required by the RFETS Management Control System AND continue project when funding and WBS scope changes are properly approved. |
| 3. | 19 | 8.2.4 | Delete Step [13] and renumber remaining steps accordingly. |
| 4. | 36 | App 5 | System Change Request Form: Add a "Bug Fix" section. |
| 5. | 49 | App 6 | Renumber sections correctly. |
| 6. | 54 | App 9 | Add "4.0 Input/Output Forms" section title. |
| 7. | 56 | App 10 | Renumber sections correctly. |

12. Justification (Reason for Modification, EJO #, TP #, etc.)

- Improve document consistency.
- Address minor RFEDS software modifications.
- Address funding for new development projects.

*If modification is for a new procedure or a revision, list concurring disciplines in Block 13, and enter N/A in Blocks 14 and 15. If modification is for any type of change or a cancellation, organizations are listed in Block 13, then Concurror prints, and signs in Block 14, and dates in Block 15.*

| 13. Organization | 14. Print, Sign (if applicable) | 15. Date (if applicable) |
|---|---|---|
| EQ | R.S. Luker | 6.6.95 |
| IR | Joe Little | |
| DM&RS | K. Bentzen | |
| | NO TRAINING REQUIRED Kevin M Kretsch 6/12/95 | |

16. Originator's Supervisor (print/sign/date) G.M. Deters X8739 D1590 G M Deters 6/6/95

| Assigned SME/Phone/Pager/Location | 18. Cost Center | 19. Charge Number | 20. Requested Completion Date | 21. Effective Date |
|---|---|---|---|---|
| K.M. Kretsch X6975, D5532 080/111 | 3115 | 98995674 | June 12, 1995 | JUNE 16, 1995 |

22. Accelerated Review? Yes ☐ No ☒ | 23. ORC Review: Not Required

24. Responsible Manager (print,sign,date) G.M. Deters X8739 D1590 G M Deters 6/6/95

Received for final dist 6/12/95

REVIEW BY ____ DATE ____

LIST OF EFFECTIVE PAGES

| Pages | Effective Date | Change Number |
|---|---|---|
| 1 | 10/21/94 | |
| 2 | 06/16/95 | 95-DMR-000723 |
| 3 | 10/21/94 | |
| 4 | 06/16/95 | 95-DMR-000723 |
| 5 | 10/21/94 | |
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## 3. OVERVIEW (continued)

- A revision history is maintained to allow reconstruction of past conditions to troubleshoot application problems if needed.

Requirements for software management are applied in a graded approach so that the level of control is commensurate with system complexity and size. Large, complex systems with a relatively high failure risk due to improper development receive the top level of control, including independent reviews, verification, and validation testing. Smaller systems with lesser ERPD mission impacts or potential for failure due to improper development are subject to fewer controls. The controls applied to each configuration modification are determined, approved, and documented on a case-by-case basis. Consistent with plant policy, the ERPD organization defines three levels of control for software: Level 1 for large complex systems, Level 2 for smaller systems, and Level 3 for systems not controlled by this plan.

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Controls for Level 1 Software programs are applied to the following life cycle activities:

| | |
|---|---|
| Phase I: | Change Request and Functional Requirements Definition |
| Phase II: | Conceptual Design and Alternatives Analysis |
| Phase III: | Detail Design and System Development |
| Phase IV: | Acceptance Testing |
| Phase V: | User Training and Systems Installation |
| Phase VI: | Production |
| Phase VII: | Retirement |

A flow chart of the Level 1 system development phases, referencing responsible organizations and specific instructions is shown in Appendix 1, Level 1 Software Management Flow Chart.

Controls for Level 2 Software programs are applied to the following life cycle activities:

| | |
|---|---|
| Phase I: | Functional Requirements Specification and Design |
| Phase II: | System Development |
| Phase III: | Acceptance Testing and Installation |
| Phase IV: | Production |
| Phase V: | Retirement |

A flow chart of the Level 2 system development phases, referencing responsible organizations and specific instructions is provided in Appendix 2, Level 2 Software Management Flow Chart.

This plan establishes the overall infrastructure, specific responsibilities, standard formats, and instructions needed to support a Software Management Program that conforms to all internal and external requirements.

## 8. INSTRUCTIONS

**NOTE 1** *The steps required to implement any given system change request will vary based on the magnitude and complexity of the request. The determination of the required steps is documented and approved on the Project Initiation and Development Processing (PI&DP) form.*

**NOTE 2** *In addition, if tests or reviews are not acceptable, the involved developers, verifiers, and validators may use professional judgement regarding return to previous phases of development as needed. Flow charts depicting the development processes are provided in Appendixes 1 & 2.*

### 8.1 Control Level Assessment

**Data Management and Reporting Services (DM&RS)**

[1] Conduct an annual ERPD software inventory of each system that is subject to SMP controls and assign a control level designator to each inventoried computer system.

[A] Gather the following information and record on Appendix 4:

- System Purpose
- Hardware in use
- Software in use
- Primary users
- System Operator

**ERPD Program or Operations Manager**

[2] Assist DM&RS in completing the annual inventory by assigning point of contact personnel that are cognizant of computer systems used within the organization.

The point of contact may be the Computer System Manager (CSM) or Computer System Security Officer.

**CSM or Organizational Representative**

[3] Provide computer system information to the DM&RS representative as requested.

**DM&RS**

[4] Distribute the Software Inventory Logsheet, including the control level designation to the:

- ERPD Director.
- Program Managers.
- CSM or System Operator.

[5] Maintain current inventory of ERPD controlled software.

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## 8.2. Level 1 Software

**NOTE:** *Where multiple performers are indicated, the User may or may not be a required participant. Wherever the User is indicated assume the caveat "if required".*

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### 8.2.1 System Change Request (SCR)

**NOTE:** *SCR forms and logsheets may be obtained from the Rocky Flats Environmental Database System (RFEDS). An example of the SCR form is shown in Appendix 5.*

**Originating Change Requestor, USM**

[1] Prepare a SCR Form.

[A] Describe the need as clearly as possible.

[B] Provide a preliminary assessment of benefit or uses and impacts to existing systems.

[2] Submit the SCR Form to the User System Manager (USM) or designated alternate.

**USM**

[3] Log in the SCR as received.

[4] Review the SCR to determine if all required information is present.

[5] Submit the SCR to the Computer System Manager on a routine basis.

The USM, CSM and Information Resources (IR) Lead meet periodically in order to bundle SCRs into work units described by a functional requirements document.

**CSM, IR Lead**

[6] Clearly define the desired change and type of action requested.

[7] Assign an initial work priority to the requested change.

[8] Bundle SCRs into a defined unit of work.

The SCR documents the need for software development, modification, emergency change, or reverse engineering.

### 8.2.2 Functional Requirements Preparation

**NOTE** *The USM may request an IR developer as needed to assist in the preparation of requirements. The objective is to clearly state the user's needs by defining output requirements, supporting input, projected hardware, storage, and database needs, etc.*

**NOTE** *User involvement is required by the PI&DP form.*

**USM, User**

[1] Prepare a functional requirements document according to the template provided in Appendix 6.

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### 8.2.3 Functional Requirements Review and Approval

**CSM, IR Lead,**

[1] Review the Functional Requirements (FR) document for adequacy and completeness, to verify that all applicable elements of the template in Appendix 6 are addressed.

[2] Document the review and a disposition of acceptance or rejection on the FR.

[3] **IF** the FR is acceptable to the reviewer,
**THEN** document the approval signatures on the FR.

[4] **IF** the FR is incomplete,
**THEN** return to Step 8.2.2[1].

**CSSO**

[5] Review the FR to ensure the FR has features that incorporate the following:

- Computer security
- Protection from unauthorized breach or access
- Protection of data in the event of catastrophic failure or power loss

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### 8.2.4 Project Initiation, Scheduling, and Priority

**CSM**

[1] Prepares the Project Initiation and Development Processing (PI&DP) form provided in Appendix 7.

This form is used to document the graded approach to development of the specified functional requirements document.

[2] Select development steps based on a qualitative assessment of modification complexity and risk of failure.

### 8.2.4 Project Initiation, Scheduling, and Priority (continued)

**CSM (continued)**

[3] Document steps deemed unnecessary, including reason why performance of the step is not needed.

[4] Submit completed PI&DP form to the IR Lead.

**IR Lead**

[5] Initiate an internal review of the change request.

[6] Assign an IR-internal System Service Request (SSR) number to the work.

[7] Assign an IR developer to the project.

[8] Determine if a baseline configuration is established or needed for the requested change.

[9] Estimate resources required, both labor and capital expenditures, if applicable.

[10] Prepare a resource-loaded project schedule, using Microsoft Project, with milestone task completion dates.

[A] Develop the schedule considering:
- The current priority list (SCR Logsheet) maintained by the CSM.
- Integration with any ongoing development milestones.
- Developer resources available to perform the work.

[B] Document the information on the PI&DP form and return the form to the CSM.

**USM, IR Lead, CSM**

[11] Review the project objectives, resources required, and development steps employed for adequacy, accuracy, and completeness.

[A] Review applicable work package WBS scope and funding and discuss with work package manager, as needed, to determine if current, approved scopes and estimates support the proposed project.

[B] **IF** project definition is not funded and approved,
**THEN** initiate work package baseline revision steps as required by the RFETS Management Control System **AND** continue project when funding and WBS scope changes are properly approved.

[12] **IF** the project definition is satisfactory,
**THEN** signature approvals are recorded on the form and work is authorized to begin.

**CSM**

[13] Provide a short project description and an estimate of costs for all projects exceeding the threshold value to the SMRB chairperson.

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### 8.2.4 Project Initiation, Scheduling, and Priority (continued)

**USM, User**

[14] **IF** the priority and completion dates established are **NOT** satisfactory, **THEN** process a priority petition.

[15] Obtain the signature of an involved Program Manager on the PI&DP form to increase the priority.

[16] Return the PI&DP form to the CSM.

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**CSM/IR Lead**

[17] Revise priorities and assign resources.

**Program or Operations Manager**

[18] **IF** rush priority is needed that will delay other system application changes, **THEN** call a priority meeting or conference including the affected Manager.

[19] Establish software development priorities that support current ERPD needs.

[20] Document resolution of priorities by Program Manager's approval signatures on the PI&DP form.

### 8.2.5 Conceptual Design, Prototype, and Alternatives Analysis

**IR Developer**

[1] Prepare a Conceptual Design and Alternatives Analysis (CD&AA) document in accordance with the content requirements of the template provided in Appendix 9. Examples that a CD&AA might address include:

- Creation of a new table versus a new "user view" of existing tables.
- Using a DOS machine versus a MAC or DEC/VMS host.
- Using commercial user interface window software versus coding a menu.

The author of the CD&AA recommends one alternative based on its merits of cost, efficiency, ease of use, or other applicable criteria. A suggested method for exploring and refining application concepts is using prototype input and output that is evaluated by the User.

### 8.2.6 CD&AA Review and Approval

**USM and IR Lead**

[1] Review the CD&AA document for adequacy, completeness, and compliance to requirements specified in the FR.

[2] Document and disposition acceptance or rejection.

### 8.2.6 CD&AA Review and Approval (continued)

**USM and IR Lead (continued)**

[3] **IF** the CD&AA document is acceptable to the reviewers,
**THEN** document the approval signatures on the report.

[4] **IF** the CD&AA is not acceptable,
**THEN** return to Subsection 8.2.5 for corrective action.

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### 8.2.7 Detail Design

**IR Developer**

[1] Prepare the following documents:

- Detail Design (DD) according to the template provided in Appendix 9.
- Draft User's Manual,
- Draft Training Guide

### 8.2.8 Detail Design Review and Approval

**User, USM, and IR Lead**

[1] Review the DD and supporting documents for adequacy and completeness.

[A] Limit user review to those items of direct User interest, such as input screens and output.

[2] **IF** the DD documents are acceptable to the reviewer,
**THEN** approve the report.

[3] **IF** the DD is not acceptable,
**THEN** return to Subsection 8.2.7 for corrective action.

### 8.2.9 Software Development

**IR Developer**

[1] Prepare the program code.

[2] Perform translation of design requirements into executable or compilable code according to industry practices that address:

- Module size.
- Internal documentation (commented code).
- Formatting and languages.
- Media.
- Naming conventions for files and variables.
- QA Records of the code.

**APPENDIX 5**
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**SYSTEM CHANGE REQUEST FORM**

Software Name _____

Software Change Request Number _____

Requestor _____Phone ext. _____ Date ____/____/____

Description of Software Action/Requirements: (attach additional sheets if needed)

_____
_____
_____
_____
_____
_____
_____

Justification for Change:

_____
_____

How will this change impact existing operations and data processing systems?

_____
_____

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**BUG FIX SECTION**

**Proposed Solution:**_____
_____
_____
_____

**IR Information:** IR Developer:_____
Current Production Version:_____ Date Started:_____ Date Complete_____

**Analysis/Comments:**

_____
_____

**ER Approvals:**

Solution Approval: _____ _____
USM/Requestor Date

Beta Test Approval: _____ _____
USM/Requestor Date

Production Approval: _____ _____
USM/Requestor Date

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## 7.0 PERFORMANCE REQUIREMENTS

<This section defines performance requirements (time-related issues) of the software or database, such as processing speed, throughput, or recovery time, as well as any size-related requirements, such as storage requirements; the number of simultaneous users to be supported; number of files and records to be handled; and size of records, tables, and files.>

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## 7.1 Recovery Time

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<This subsection sets requirements which limit system downtime.>

EXAMPLE:

In the event of a system failure, all data must be recovered within 12 hours to satisfy the requirements set forth by DOE, CDPHE and EPA.

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## 7.2 Multiple Use

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<This subsection establishes the system requirements for multiple users.>

EXAMPLE:

The number of simultaneous users is anticipated to be between five and seven for this lab upload program.

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## 7.3 Data Elements

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<This subsection provides a description of each element, including length, type, and number of occurrences. >

EXAMPLE:

This application will require one additional table to store Ecology related data. See the attached description of data elements for this table.

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## 7.4 File and Record Size Requirements

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<This subsection provides the first insight on file size, possible file dynamics, and expected record size requirements.>

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EXAMPLES:

1) The total number of characters in each row of this table will be 369.

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2) Initially this table will be loaded with approximately 4,000 rows of data. This is anticipated to grow at a rate of approximately 1,000 rows per month throughout lifecycle of software.

### 7.5 Response Requirements

<This subsection reflects the requirement for response in a distributed or remote system. The information must include:

- maximum response time based upon status of system.
- average expected response time based upon status of system.
- staging factors for responses if the system implementation is to be phased.
- identification of test and production response differences if acceptable.

Any other response oriented factor which would modify the value of the system to the user.>

EXAMPLE:

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The new lab load system must be capable of loading a 10,000 record file within 5 min during peak system loading time.

## 8.0 TEST AND INSTALLATION PLAN REQUIREMENTS

<This section specifies requirements for software user testing and final installation, including specific definition of test cases and acceptance criteria. This section must define the test cases and datasets necessary to demonstrate that the completed modification fulfills selected requirements specified herein. The degree of accuracy desired or required, any qualification of the quantitative requirements of the comparisons, is also stated. Test requirements must be appropriate to the system under development. Installation test criteria for large modifications should prepare test cases that demonstrate that installation of the current release has not adversely effected other program applications or databases. Whenever possible, numeric acceptance criteria shall be established and validated through appropriate test cases.>

EXAMPLES:

1) Prior to implementation of this system, the input screens will be compared on a field by field basis with input requirements laid out in Appendix 3.

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2) The lab QC program shall successfully calculate 100% of duplicate results using test cases of 30 paired, pre-calculated duplicate results in each of the following parameter groups: volatile organics, semi-volatile organics, inorganics, water quality parameters, pesticides, and herbicides.

3) Validation of the new system will be accomplished using the development server. Tests will be performed by SMO personnel running at least ten different data uploads. All uploaded files will be checked against original files. File correspondence must be 100%.

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## 9.0 REVIEW AND APPROVAL RECORD

<This section provides a signature record indicating that all reviewers have approved the functional requirements as necessary and sufficient to satisfy the involved users and applicable system change requests. The following signatures are required at minimum: the Computer System Manager, the IR-Lead, and involved technical managers (users) whose operations will be supported or affected by the change.>

Computer System Manager _____ Date _____
Name Signature

Computer System Security Officer _____ Date _____
Name Signature

IR-Lead _____ Date _____
Name Signature

Involved Technical Program Manager or User

_____ Organization _____ Date _____
Name Signature

Involved Technical Program Manager or User

_____ Organization _____ Date _____
Name Signature

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**APPENDIX 9**
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**4.0 Input/Output Formats**

4.1 MENU FORMATS

4.2 FORM FORMATS

4.3 REPORT FORMATS

4.4 FILE FORMATS

**5.0 Data Dictionary**

<This section contains a detailed data dictionary based upon the available information presented in the FRS, CD and AA.>

**6.0 Pseudocode**

< If appropriate for the particular project, a section containing pseudocode may be added for all major logic components.>

6.1 TRIGGERS

6.2 PROCEDURES

6.3 SCRIPTS

6.4 OTHER

**APPENDIX 10**
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### 3.0 Test Requirements

<This section defines the requirements for software testing. Specifically, it addresses these areas:

- Required Tests and Test Sequence
- Required Ranges of Input Parameters
- Criteria for Establishing Test Cases
- Requirements for Testing Logic Branches
- Requirements for Hardware Integration
- Expected Output Values>

### 4.0 Acceptance Criteria

<This section identifies the quantitative criteria by which the customer will accept the software as meeting the original requested functionality requirements.>

### 5.0 Test Cases

<This section outlines specific test cases which are required to be performed to address all stated test requirements, and meet stated acceptance criteria. Test cases shall be designed to test all features or functional modules of the software.>

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### 6.0 Test Procedure

<This section contains a procedure to direct the ER testing staff through the testing process. It must be oriented toward a non-technical user, and guide the user through all of the required test cases.>

### 7.0 Test Schedule and Staffing Needs

<This section provides a testing schedule, for situations where testing involves multiple testers, and/or the testing must take place over a period of days or weeks. This schedule lists the personnel involved and estimates the level of effort required to complete the test. If staff availability is a question, this section may need to be reviewed and approved by involved management.>

### 8.0 Approvals

<This section lists the required approvals, by organization and/or individual's name.>

Print name, then sign:

**IR Lead Approval** _____ Date ___/___/____

**USM Approval** _____ Date ___/___/____